That which is claimed is:

1. A method of allocating bandwidth among a plurality of queues, wherein each of the plurality of queues is associated with a quality of service and has a corresponding quantum value, the method comprising the steps of:

determining an available quantum value based on a total amount of committed bandwidth on a downstream channel and a total amount of bandwidth on the downstream channel; and

updating the quantum values of each of the plurality of queues by an update quantum value corresponding to respective ones of the plurality of queues, the update quantum values being based on the available quantum value, a total reserved quantum value corresponding to packets enqueued in the plurality of queues for an update period and the quality of service associated with the respective queue.

2. The method according to Claim 1, wherein the quantum values correspond to the quality of service associated with the respective queue.

3. The method according to Claim 1, wherein the step of determining the available quantum value comprises the steps of:

calculating the total amount of committed bandwidth on the downstream channel;

calculating the total amount of bandwidth on the downstream channel; and

determining the difference between the total amount of committed bandwidth on the downstream channel and the total amount of bandwidth on the downstream channel.

4. The method according to Claim 3, wherein the step of calculating the total amount of committed bandwidth on the downstream channel is based on a total amount of bandwidth committed to voice traffic, data traffic and signaling traffic.

5. The method according to Claim 1, wherein the step of updating the quantum values comprises the steps of:

calculating the total reserved quantum value for the update period based on a minimum reserved quantum value of each of the plurality of queues; and

updating the quantum values of each of the plurality of queues by an update quantum value, wherein the update quantum value for each of the plurality of queues comprises:

zero when the available quantum value is less than zero;

the minimum reserved quantum value for the update period plus an excess quantum value for the update period when the available quantum value is larger than the total reserved quantum value; and

the minimum reserved quantum value for the update period minus a deficit quantum value for the update period when the total reserved quantum value is larger than the available quantum value.

6. The method according to Claim 5, wherein the excess quantum value and the deficit quantum value correspond to the quality of service associated with the respective queue.

7. The method according to Claim 5, wherein the excess quantum value and the deficit quantum value are proportional to the quality of service associated with the respective queue.

8. The method according to Claim 1 wherein the method is implemented in a broadband multiple access system.

9. The method according to Claim 1 wherein the update period is a constant update interval.

10. A method according to Claim 1 wherein the update period is not a constant update interval.

11. The method according to Claim 10, wherein the update period is a current time minus a time of the last update period.

12. The method according to Claim 1, wherein the plurality of queues contain a plurality of packets that are processed using a deficit round robin algorithm.

13. A system for allocating bandwidth comprising:

a plurality of queues, each of the plurality of queues being associated with a quality of service and having a corresponding quantum value, configured to store packets arriving from the network;

an output queue configured to receive packets from the plurality of queues and forward them to a channel;

a bandwidth allocator circuit configured to classify received packets based on quality of service requirements and direct the packets to one of the plurality of queues, the bandwidth allocator circuit further comprising:

a bandwidth differential circuit configured to determine an available quantum value based on a total amount of committed bandwidth on a downstream channel and a total amount of bandwidth on the downstream channel; and

a quantum updating circuit configured to update the quantum values of each of the plurality of queues by an update quantum value corresponding to respective ones of the plurality of queues, the update quantum values being based on the available quantum value, a total reserved quantum value corresponding to packets enqueued in the plurality of queues for an update period and the quality of service associated with the respective queue.

14. The system to Claim 13, wherein the quantum values correspond to the quality of service associated with the respective queue.

15. The system according to Claim 13, wherein bandwidth differential circuit comprises:

a bandwidth calculator circuit configured to calculate the total amount of committed bandwidth on the downstream channel and the total amount of bandwidth on the downstream channel and the difference between the total amount of committed bandwidth on the downstream channel and the total amount of bandwidth on the downstream channel.

16. The system according to Claim 15, wherein the bandwidth calculator circuit is further configured to calculate the total amount of committed bandwidth on the downstream channel based on a total amount of bandwidth committed to voice traffic, data traffic and signaling traffic.

17. The system according to Claim 13, wherein the quantum updating circuit comprises:

a quantum calculator circuit configured to calculate the total reserved quantum value for the update period based on a minimum reserved quantum value of each of the plurality of queues and update the quantum values of each of the plurality of queues by an update quantum value, wherein the update quantum value for each of the plurality of queues comprises:

zero when the available quantum value is less than zero;

the minimum reserved quantum value for the update period plus an excess quantum value for the update period when the available quantum value is larger than the total reserved quantum value; and

the minimum reserved quantum value for the update period minus a deficit quantum value for the update period when the total reserved quantum value is larger than the available quantum value.

18. The system according to Claim 17, wherein the excess quantum value and the deficit quantum value correspond to the quality of service associated with the respective queue.

19. The system according to Claim 17, wherein the excess quantum value and the deficit quantum value are proportional to the quality of service associated with the respective queue.

20. The system according to Claim 13 wherein the system is a broadband multiple access system.

21. The system according to Claim 13 wherein the update period is a constant update interval.

22. A system according to Claim 13 wherein the update period is not a constant update interval.

23. The system according to Claim 22, wherein the update period is a current time minus a time of the last update period.

24. The system according to Claim 13, wherein the plurality of queues contain a plurality of packets that are processed using a deficit round robin algorithm.

25. A system for allocating bandwidth among a plurality of queues, wherein each of the plurality of queues is associated with a quality of service and has a corresponding quantum value, comprising:

means for determining an available quantum value based on a total amount of committed bandwidth on a downstream channel and a total amount of bandwidth on the downstream channel; and

means for updating the quantum values of each of the plurality of queues by an update quantum value corresponding to respective ones of the plurality of queues, the update quantum values being based on the available quantum value, a total reserved quantum value corresponding to packets enqueued in the plurality of queues for an update period and the quality of service associated with the respective queue.

26. A computer program product for allocating bandwidth among a plurality of queues, wherein each of the plurality of queues is associated with a quality of service and has a corresponding quantum value, comprising:

a computer readable program medium having computer readable program code embodied therein, the computer readable program code comprising:

computer readable program code which determines an available quantum value based on a total amount of committed bandwidth on a downstream channel and a total amount of bandwidth on the downstream channel; and

computer readable program code which updates the quantum values of each of the plurality of queues by an update quantum value corresponding to respective ones of the plurality of queues, the update quantum values being based on the available quantum value, a total reserved quantum value corresponding to packets enqueued in

the plurality of queues for an update period and the quality of service associated with the respective queue.